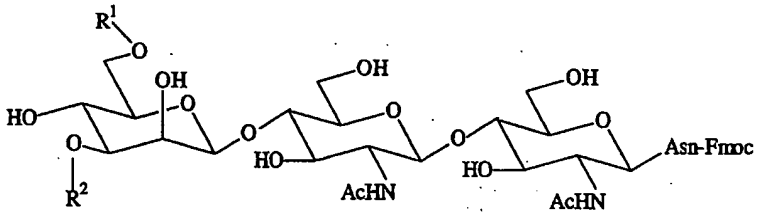
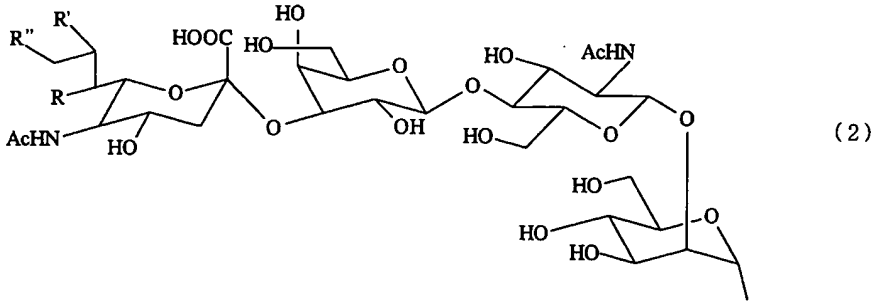
IN THE CLAIMS:

1. (currently amended) An asparagine-linked α2,3-oligosaccharide derivative having undeca- to hepta-saccharides containing fluorine and represented by the formula (1) given below



(1)

wherein R^1 and R^2 are each a hydrogen atom or one of the groups represented by the formulae (2) to (5) and may be the same or different, provided that one of R^1 and R^2 should always be the group of the formula (2)[[.]]



(2)

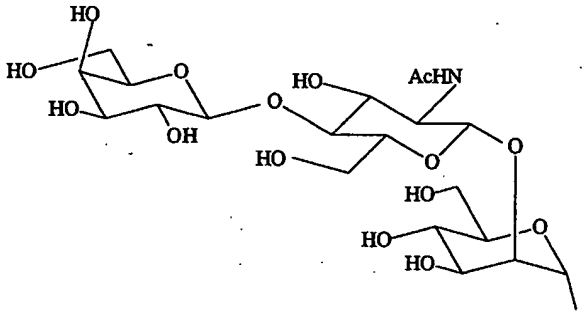
R, R′ and R″ are in the following combinations

(a) R=F, R'=OH, R"=OH,

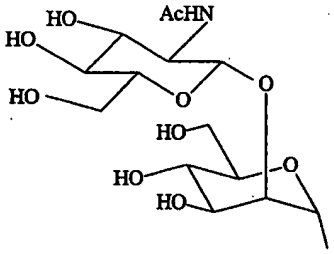
(b) R=OH, R'=F, R"=OH,

(c) R=OH, R'=OH, R"=F, and

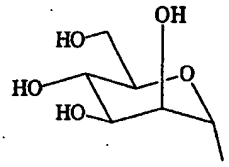
(d) R=OH, R'=OH, R"=OH



(3)



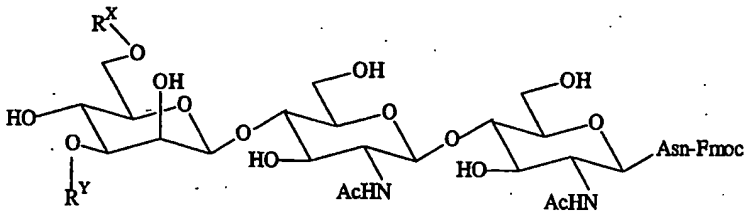
(4)



(5)

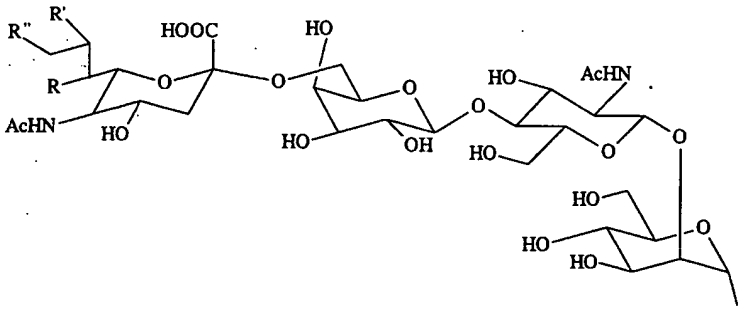
2. (currently amended) An asparagine-linked α2,6-oligosaccharide derivative having undeca- to hepta-saccharides,

containing fluorine and represented by the formula (6) given below



(6)

wherein R^x and R^y are each a hydrogen atom, a group represented by the formula (7) or one of the groups represented by the formulae (3) to (5) as defined in claim 1, provided that one of R^x and R^y should always be a group of the formula (7)[[.]]



(7)

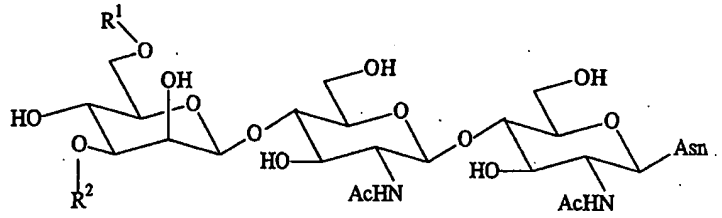
R, R′ and R″ are in the following combinations

(a) R=F, R'=OH, R"=OH,

(b) R=OH, R'=F, R"=OH, and

(c) R=OH, R'=OH, R"=F.

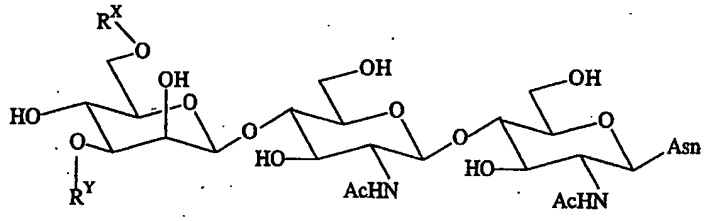
3. (currently amended) An asparagine-linked α2,3-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (8) given below



(8)

wherein R^1 and R^2 are as ~~defined above~~ defined in claim 1.

4. (currently amended) An asparagine-linked α2,6-oligosaccharide having undeca- to hepta-saccharides, containing fluorine and represented by the formula (9) given below

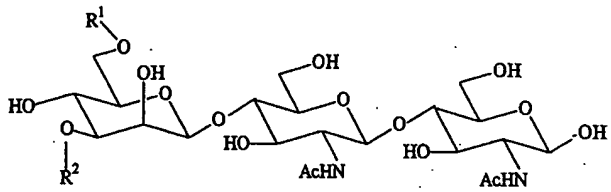


(9)

wherein R^x and R^y are as ~~defined above~~ defined in claim 2.

5. (currently amended) An α2,3-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (10) given

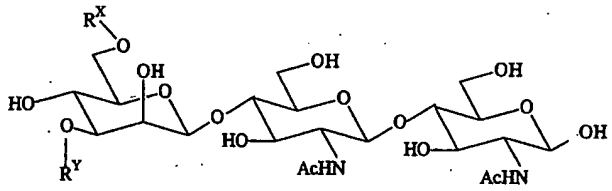
below



(10)

wherein R^1 and R^2 are as ~~defined above~~ defined in claim 1.

6. (currently amended) An α2,6-oligosaccharide having undeca- to hepta-saccharides, containing fluorine and represented by the formula (11) given below

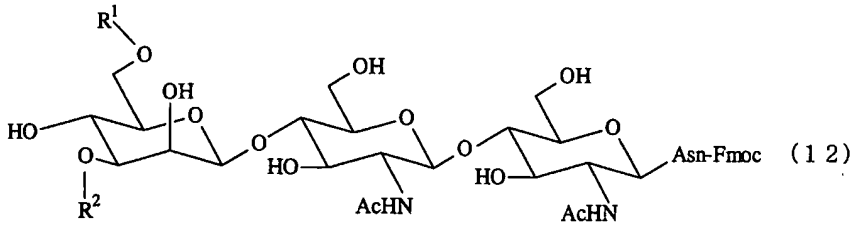


(11)

wherein R^x and R^y are as ~~defined above~~ defined in claim 2.

7. (currently amended) A process for preparing an asparagine-linked α2,3-disialooligosaccharide derivative having undecasaccharide and represented by the formula (12) given below,

the process being characterized by transferring sialic acid or a sialic acid derivative to an asparagine-linked oligosaccharide protected with a lipophilic protective group using a sialic acid transferase, and subjecting the resulting asparagine-linked oligosaccharide protected with a lipophilic protective group to chromatography for separation

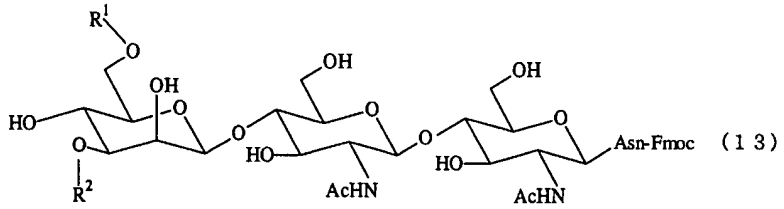


(12)

wherein R^1 and R^2 are each a group represented by the formula (2) as defined in claim 1.

8. (currently amended) A process for preparing an asparagine-linked α2,3-monosialooligosaccharide derivative having decasaccharide and represented by the formula (13) given below, the process being characterized by transferring sialic acid or a sialic acid derivative to an asparagine-linked oligosaccharide protected with a lipophilic protective group using a sialic acid transferase, and subjecting the resulting asparagine-linked oligosaccharide

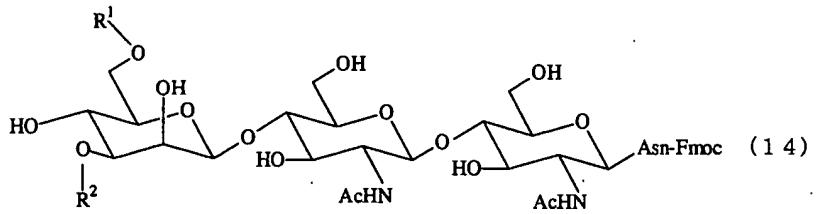
protected with a lipophilic protective group to chromatography for separation



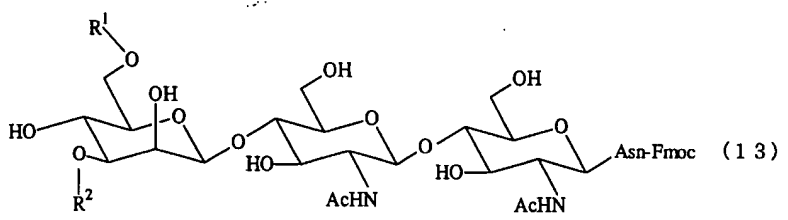
(13)

wherein one of R^1 and R^2 is a group represented by the formula (2), and the other thereof is a group represented by the formula (3), wherein formula (2) and formula (3) are as defined in claim 1.

9. (currently amended) A process for preparing an asparagine-linked α2,3-monosialooligosaccharide derivative having nonasaccharide and represented by the formula (14) given below, the process being characterized by hydrolyzing an asparagine-linked monosialooligosaccharide derivative represented by the formula (13) using a ~~galactose hydrolase~~ galactosidase



(14)



(13)

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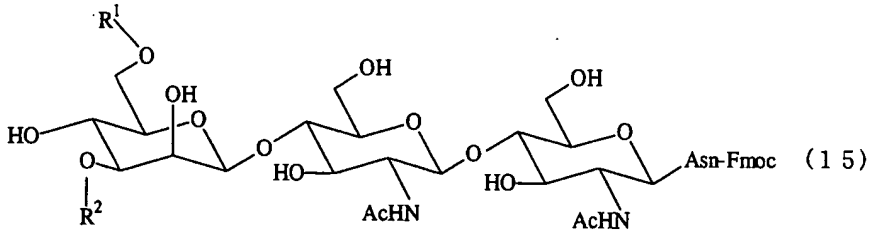
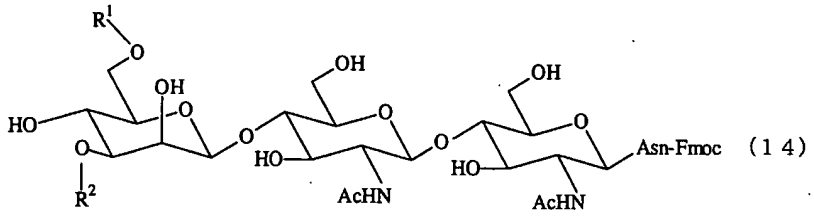
wherein one of R^1 and R^2 is a group represented by the formula (2), and the other thereof is a group represented by the formula (4), wherein formula (2) and formula (4) are as defined in claim 1.

10. (currently amended) A process for preparing an asparagine-linked α2,3-monosialooligosaccharide derivative having octasaccharide and represented by the formula (15) given below, the process being characterized by hydrolyzing an asparagine-linked monosialooligosaccharide derivative represented by the formula (14) using an ~~N-acetylglucosamin hydrolase~~ N-acetylglucosaminidase



(15)



(14)

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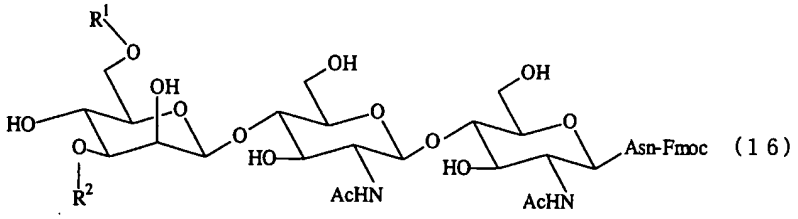
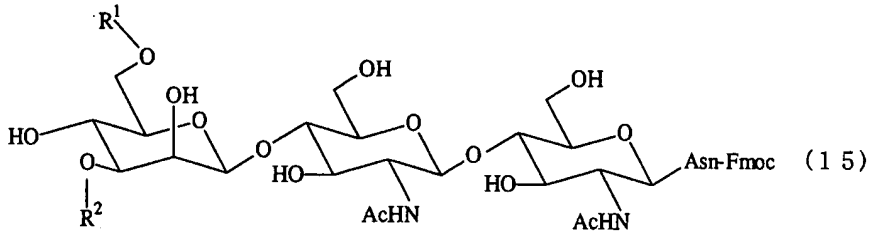
wherein one of R^1 and R^2 is a group represented by the formula (2), and the other thereof is a group represented by the formula (5), wherein formula (2) and formula (5) are as defined in claim 1.

11. (currently amended) A process for preparing an asparagine-linked α2,3-monosialooligosaccharide derivative having heptasaccharide and represented by the formula (16) given below, the process being characterized by hydrolyzing an asparagine-linked monosialooligosaccharide derivative represented by the formula (15) using a ~~mannos hydrolase~~ mannosidase



(16)



(15)

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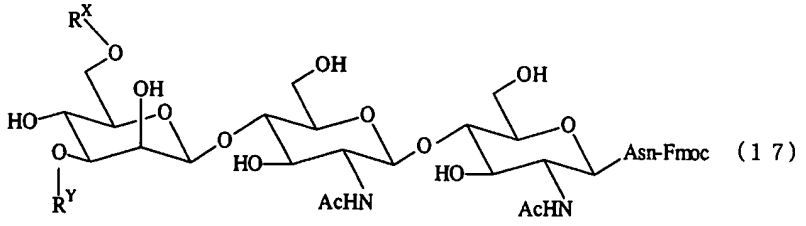
wherein one of R^1 and R^2 is a group represented by the formula (2) as defined in claim 1, and the other thereof is a hydrogen atom.

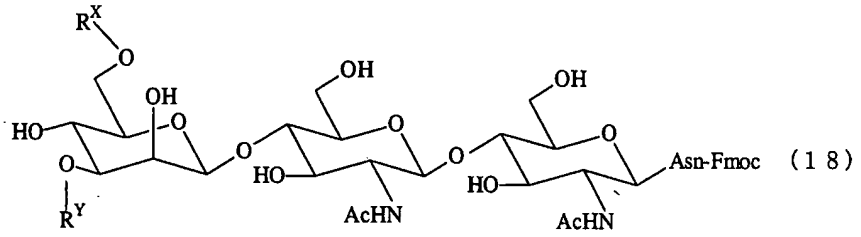
12. (currently amended) A process for preparing an asparagine-linked α2,6-disialooligosaccharide derivative having undecasaccharide and represented by the formula (17) given below, the process being characterized by transferring sialic acid or a sialic acid derivative to an asparagine-linked oligosaccharide protected with a lipophilic protective group using a sialic acid transferase, and subjecting the resulting asparagine-linked oligosaccharide protected with a lipophilic protective group to chromatography for separation



(17)

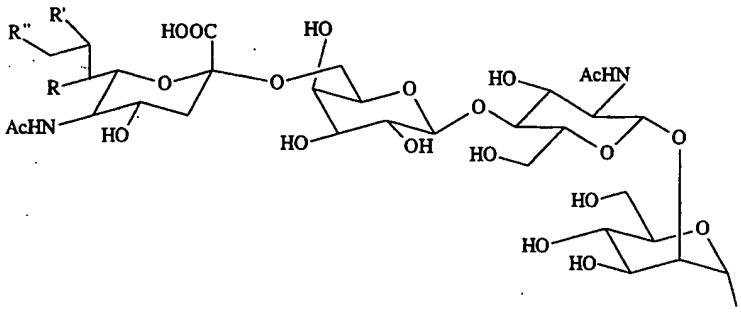
wherein R^x and R^y are each a group represented by the formula (7) as defined in claim 2.

13. (currently amended) A process for preparing an asparagine-linked α2,6-monosialooligosaccharide derivative having decasaccharide and represented by the formula (18) given below, the process being characterized by transferring sialic acid or a sialic acid derivative to an asparagine-linked oligosaccharide protected with a lipophilic protective group using a sialic acid transferase, and subjecting the resulting asparagine-linked oligosaccharide protected with a lipophilic protective group to chromatography for separation



(18)

wherein one of R^x and R^y is a group represented by the formula (7),



(7)

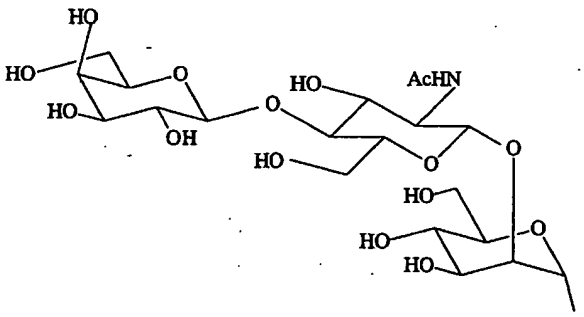
R, R′ and R″ are in the following combinations

(a) R=F, R'=OH, R"=OH,

(b) R=OH, R'=F, R"=OH, and

(c) R=OH, R'=OH, R"=F,

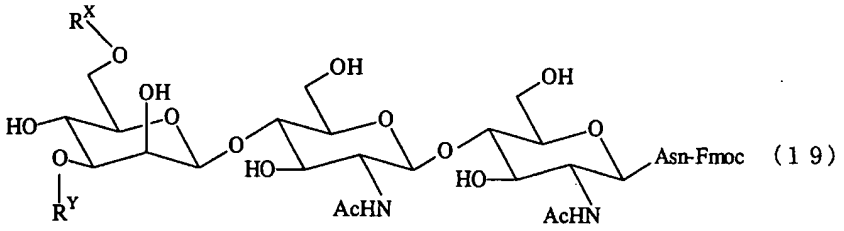
and the other thereof is a group represented by the formula (3)



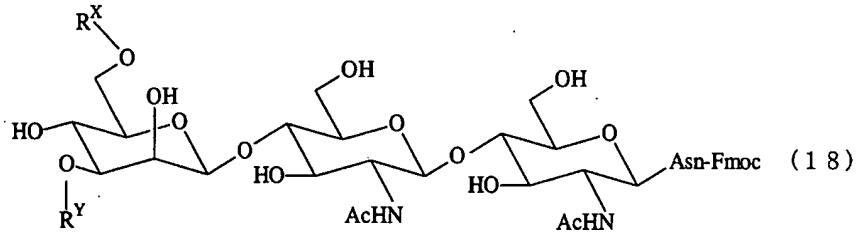
(3)

14. (currently amended) A process for preparing an asparagine-

linked α2,6-monosialooligosaccharide derivative having nonasaccharide and represented by the formula (19) given below, the process being characterized by hydrolyzing an asparagine-linked monosialooligosaccharide derivative represented by the formula (18) using a ~~galactos hydrolase~~ galactosidase



(19)



(18)

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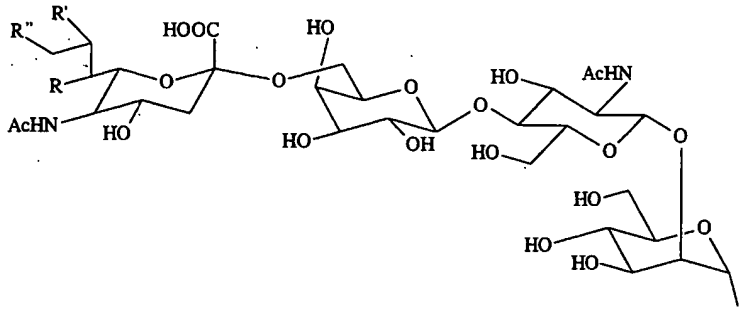
wherein one of R^x and R^y is a group represented by the formula (7)



(7)

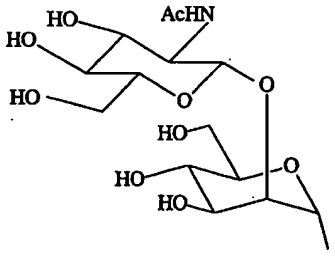
R, R′ and R″ are in the following combinations

(a) R=F, R'=OH, R"=OH,

(b) R=OH, R'=F, R"=OH, and

(c) R=OH, R'=OH, R"=F,

and the other thereof is a group represented by the formula (4)



(4)

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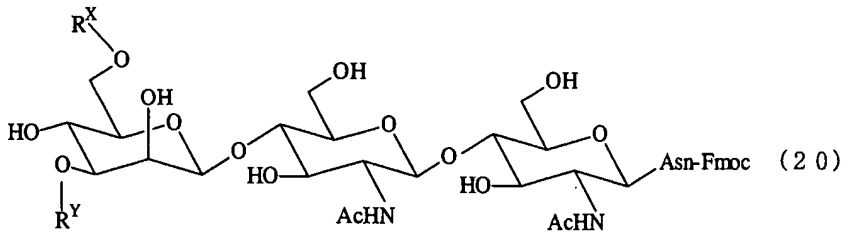
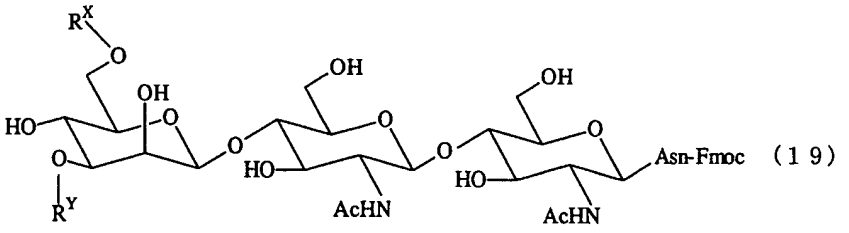
15. (currently amended) A process for preparing an asparagine-linked α2,6-monosialooligosaccharide derivative having octasaccharide and represented by the formula (20) given below, the process being characterized by hydrolyzing an asparagine-linked monosialooligosaccharide derivative represented by the formula (19) using an ~~N-acetylglucosamin hydrolase~~ N-acetylglucosaminidase



(20)



(19)

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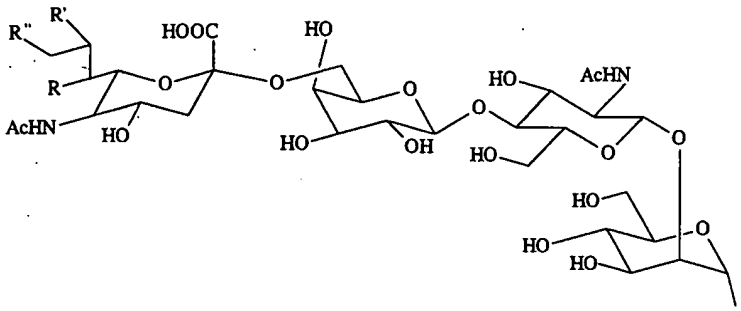
wherein one of R^x and R^y is a group represented by the formula (7)



(7)

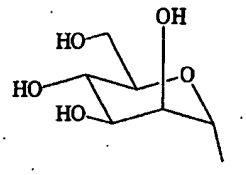
R, R′ and R″ are in the following combinations

(a) R=F, R'=OH, R"=OH,

(b) R=OH, R'=F, R"=OH, and

(c) R=OH, R'=OH, R"=F,

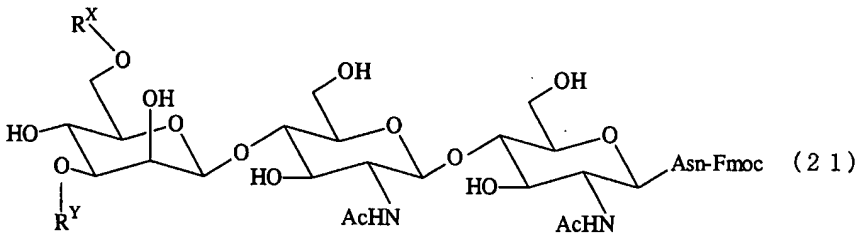
and the other thereof is a group represented by the formula (5)



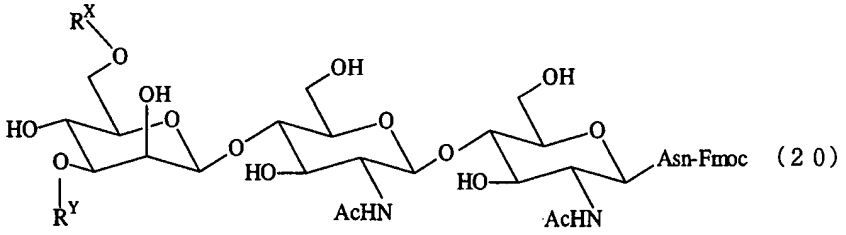
(5)

16. (currently amended) A process for preparing an asparagine-linked α2,6-monosialooligosaccharide derivative having

heptasaccharide and represented by the formula (21) given below, the process being characterized by hydrolyzing an asparagine-linked monosialooligosaccharide derivative represented by the formula (20) using a ~~mannos hydrolase~~ mannosidase



(21)



(20)

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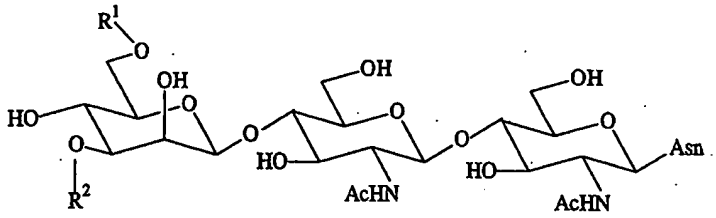
wherein one of R^x and R^y is a group represented by the formula (7) as defined in claim 2, and the other thereof is a hydrogen atom.

17. (currently amended) A process for preparing an aspareagine-linked α2,3-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (8)



(8)

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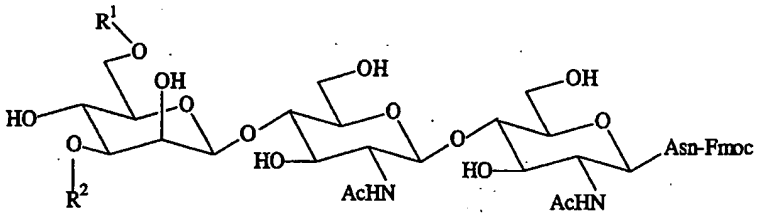
the process being characterized by removing the protective group from an asparagine-liked α2,3-oligosaccharide derivative having undeca- to hepta-saccharides and represented by the formula (1)

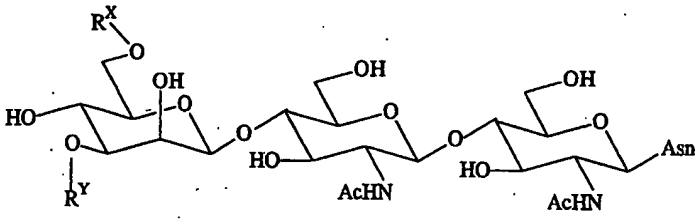


(1)

---

wherein R^1 and R^2 in formula (8) and formula (1) are as defined in claim 1.

18. (currently amended) A process for preparing an aspareagine-linked α2,6-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (9)



(9)

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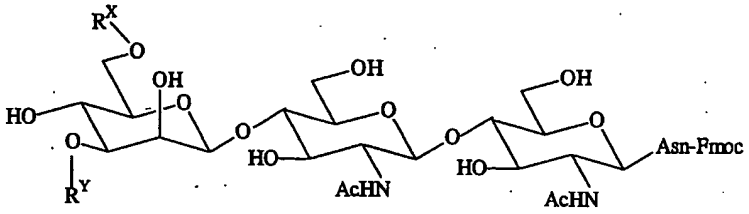
the process being characterized by removing the protective group from an asparagine-liked α2,6-oligosaccharide derivative having undeca- to hepta-saccharides and represented by the formula (6)



(6)

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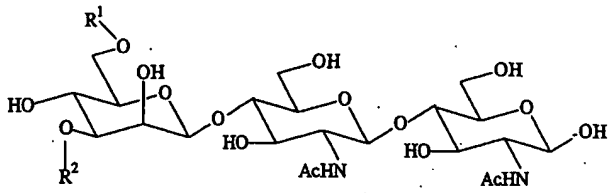
wherein R^x and R^y in formula (9) and formula (6) are as defined in claim 2.

19. (currently amended) A process for preparing an α2,3-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (10)



(10)

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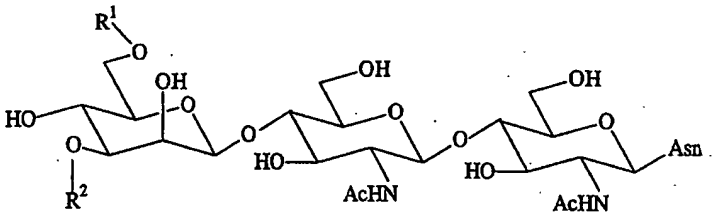
the process being characterized by removing the asparagine residue from an asparagine-liked α2,3-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (8)



(8)

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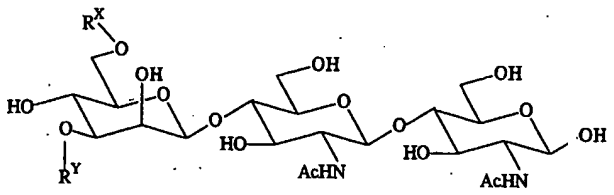
wherein R^1 and R^2 in formula (10) and formula (8) are as defined in claim 1.

20. (currently amended) A process for preparing an α2,6-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (11)



(11)

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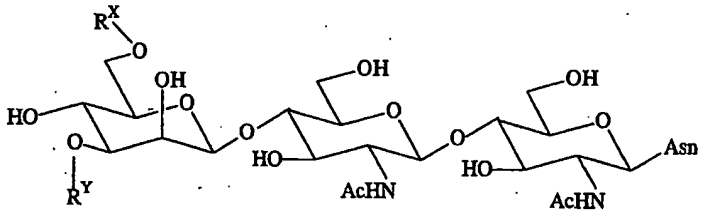
the process being characterized by removing the asparagine residue from an asparagine-liked α2,6-oligosaccharide having undeca- to hepta-saccharides and represented by the formula (9)



(9)

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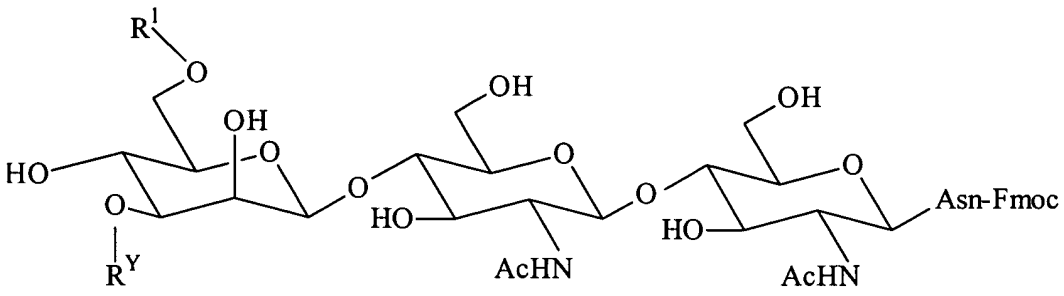
wherein R^x and R^y in formula (11) and formula (9) are as defined in claim 2.

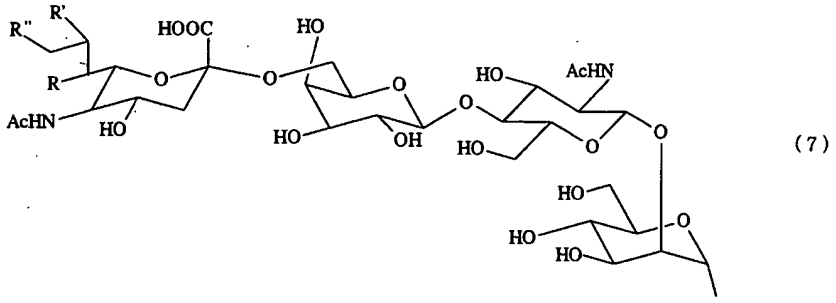
21. (currently amended) An asparagine-linked (α2,3) (α2,6)-oligosaccharide derivative having undecasaccharides containing fluorine and represented by the formula (22) given below



(22)

(22)

wherein R^1 is a group represented by the formula (2) as defined in claim 1, R^y is a group represented by the formula (7) below[[.]]



(7)

R, R′ and R″ are in the following combinations

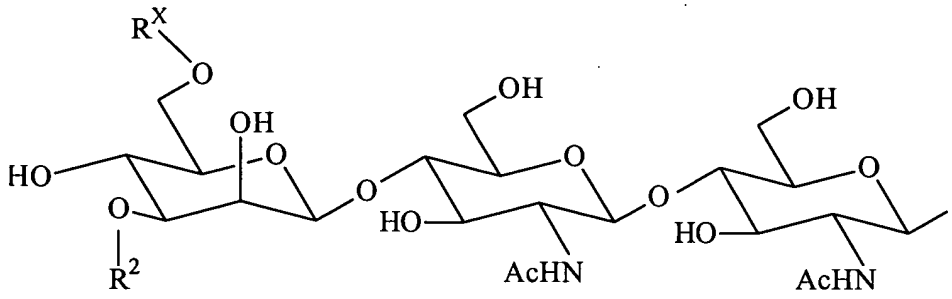
(a) R=F, R'=OH, R"=OH,

(b) R=OH, R'=F, R"=OH, and

(c) R=OH, R'=OH, R"=F

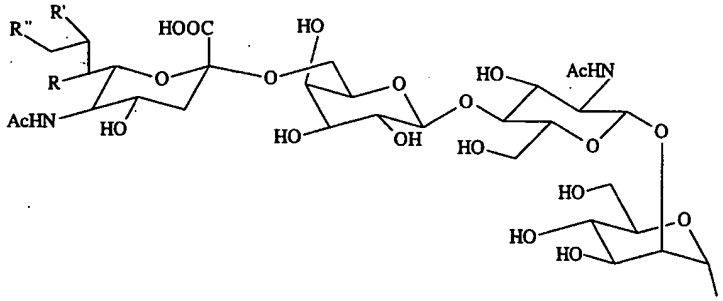
~~(d) R=OH, R'=OH, R"=OH.~~

22. (currently amended) An asparagine-linked (α2,3) (α2,6)-oligosaccharide derivative having undecasaccharides containing fluorine and represented by the formula (23) given below



(23)

wherein R^2 is a group represented by the formula (2) as defined in claim 1, R^x is a group represented by the formula (7) below.



(7)

R, R′ and R″ are in the following combinations

(a) R=F, R'=OH, R"=OH,

(b) R=OH, R'=F, R"=OH, and

(c) R=OH, R'=OH, R"=F

~~(d) R=OH, R'=OH, R"=OH~~.

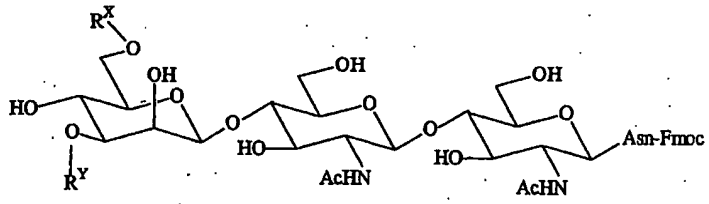
23. (canceled)

24. (currently amended) An asparagine-linked oligosaccharide derivative containing at least one fucose in N-acetylglucosamine on the nonreducing terminal side of the asparagine-linked α2,3-oligosaccharide derivative having undeca- to hepta-saccharides containing fluorine and represented by the formula (1) as defined in claim 1.

25. (currently amended) An asparagine-linked oligosaccharide derivative containing at least one fucose in N-acetylglucosamine on the nonreducing terminal side of the asparagine-linked α2,6-oligosaccharide derivative having undeca- to hepta-saccharides containing fluorine and represented by the formula (6) as defined in claim 2.

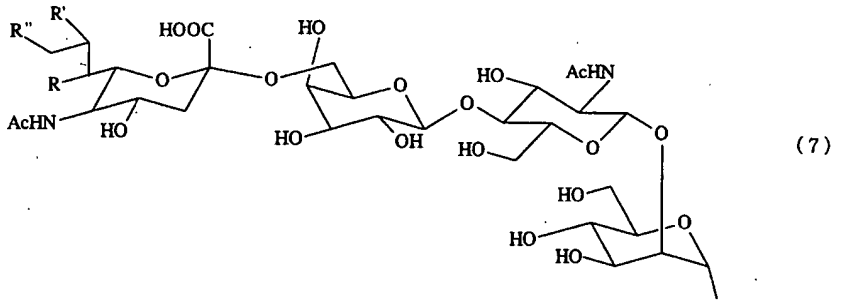
26. (currently amended) An asparagine-linked oligosaccharide derivative containing at least one fucose in N-acetylglucosamine on the nonreducing terminal side of the asparagine-linked α2,6-

oligosaccharide derivative having undeca- to hexa-saccharides and represented by the formula (6a)[[.]]



(6 a)

wherein R^x and R^y are each a hydrogen atom, a group represented by the formula (7) or one of the groups represented by the formulae (3) to (5) as defined in claim 1, provided that one of R^x and R^y should always be a group of the formula (7) or (3)



(7)

where R = OH, R′ = OH and R″ = oH.

27. (currently amended) A process for preparing an asparagine-linked oligosaccharide derivative containing at least one fucose in

N-acetylglucosamine on the nonreducing terminal side of an asparagine-linked oligosaccharide containing fluorine wherein the asparagine has amino group ~~nitrogen~~ protected with a lipophilic protective group and represented by the formula (1) as defined in claim 1, the process being characterized by transferring fucose to the asparagine-linked oligosaccharide wherein the asparagine has the protected amino group ~~nitrogen~~ with a lipophilic protective group using a fucose transferase, and subjecting the resulting asparagine-linked oligosaccharide protected with the lipophilic protective group to chromatography for separation.

28. (new) A process for preparing an asparagine-linked oligosaccharide derivative containing at least one fucose in N-acetylglucosamine on the nonreducing terminal side of an asparagine-linked oligosaccharide containing fluorine wherein the asparagine has amino group protected with a lipophilic protective group and represented by the formula (6) as defined in claim 2, the process being characterized by transferring fucose to the asparagine-linked oligosaccharide wherein the asparagine has the protected amino group with a lipophilic protective group using a fucose transferase, and subjecting the resulting asparagine-linked oligosaccharide protected with the lipophilic protective group to

chromatography for separation.